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February 3, 1949

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Able Mabel

See Page 89

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GENERAL SCIENCE

Scientists Pushed Around

They are urged to "get busy" in order to assure well-conceived National Science Foundation, broader research programs and greater funds for science.

► SCIENTISTS have "let themselves be pushed around" when it comes to getting legislation to give them "favorable working conditions" and "security," an officer of the nation's largest general science society believes.

Dr. Howard A. Meyerhoff, administrative secretary of the American Association for the Advancement of Science, urged his fellow scientists to "get busy" if they want the creation of a National Science Foundation. Bills to establish the civilian foundation for the direction of government support of research have been killed three times since the war.

"We can be more powerful than we know, and we might try throwing our weight around—just once, in the interest of a well-conceived National Science Foundation, that will bring even greater benefit to the nation than it will to individual scientists," Dr. Meyerhoff suggested in the *BULLETIN OF THE ATOMIC SCIENTISTS* (Jan.).

He called on scientists to tell Congress if they want broader research programs and greater funds for science.

"Representatives and senators respond to pressure, not to indifference," scientists were advised.

Dr. Meyerhoff compared the scientists' position with labor, industry and the military. The special needs of scientists he termed "mental security." This consists of independence in scientific work, facilities for work and assured support to guarantee completion of research projects, the AAAS official said.

Dr. Meyerhoff declared that these conditions could be provided by a foundation.

A bill to establish the foundation which has been introduced in the Senate came under attack in the same publication from the Washington Association of Scientists, an organization affiliated with the Federation of American Scientists.

The bill, identical with one which passed the Senate but failed in the House of Representatives during the last Congress, has been re-introduced by a bi-partisan group of senators.

Terming the bill "the weak version of the foundation," the statement by a group from the local Association charges that the legislation does not provide enough authority for the foundation.

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Cincinnati.

Present methods of radioactive waste disposal are safe, AEC experts stated at the Conference. The Clinch River, which receives radioactive wastes from the Oak Ridge plant, has less radioactivity than many mineral waters widely used in the United States for drinking. The amount of radiation from all Oak Ridge operations that gets into the air is less than the extra cosmic radiation a person gets in going from sea level to Denver at 5,000 feet altitude. These examples were given by Dr. Karl Z. Morgan, director of the health physics division at Oak Ridge.

But AEC scientists and state and national health and sanitation authorities are working now toward safe and cheaper disposal of radioactive wastes in the future when there are many more atomic energy plants in many parts of the country.

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AGRICULTURE

"Tagged" Atoms Show Plants' Phosphate Use

► RADIOACTIVE phosphorus, used in the phosphate fertilizer supplied to plants in experimental plots in many parts of the country, has taught agricultural scientists a lot they didn't know a year ago. They gathered at the Beltsville experiment station of the U. S. Department of Agriculture, and told each other what they have learned by tracing the "tagged" element through plant bodies.

Plants with large, deep root systems, like corn, don't make as much use of fertilizer phosphorus as plants with more limited root systems, like potatoes, stated Dr. W. L. Nelson of the North Carolina Agricultural Experiment Station. Deep-rooted plants depend more on phosphorus already present in the soil.

Weather influences the uptake of phosphate fertilizer, Dr. N. S. Hall, also of the North Carolina station, told the meeting. "Tagged" phosphate placed as a side dressing during a drought in his state was not utilized at all, whereas the same fertilizer similarly placed in other states enjoying normal rainfall did get taken up by the plants.

The first cooperative fertilizer research program concentrated its efforts on phosphorus, stated Dr. F. W. Parker of the U. S. Department of Agriculture. Next radioactive elements to be utilized in similar researches will probably be calcium and sulfur.

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BACTERIOLOGY-PUBLIC HEALTH

Atomic Waste Disposal

Germs may prove to be inexpensive and safe agents for purifying radioactive liquid wastes. Sludge of modern sewage disposal plant tested.

► BACTERIA, germs to the layman, may in future be used to take care of dangerous, radioactive liquid wastes from atomic energy plants, piles and the like.

Use of them for this purpose would provide safe disposal of these wastes at less cost than chemical methods, Dr. C. C. Ruchhoff of the U. S. Public Health Service's Environmental Health Center at Cincinnati, Ohio, told an Atomic Energy Commission meeting in Washington.

The bacteria would be used much as they are now to purify wastes in modern sewage disposal plants.

Experiments at Los Alamos, Dr. Ruchhoff reported, suggest that a two-stage activated sludge process can be expected to remove 99% of plutonium from wastes. The fluid remaining should then approach the tolerance, or safe, limit of plutonium

that can be discharged into a stream.

The activated sludge is made up of massive colonies of bacteria embedded in a jelly-like substance. When the bacteria swell through absorbing water they present an enormous surface area that can hold radioactive materials.

Questions still to be answered are: 1. Will the bacteria absorb and concentrate other types of radioactive material besides plutonium and uranium? (The Los Alamos experiments showed the bacteria took up uranium as well as plutonium.) 2. What can be used to feed the bacteria in the sludge? Normally they feed on organic sewage material being treated. But in many areas where radioactive wastes are found, adequate sewage is not available.

Studies to bring the answers are now under way at Oak Ridge, Los Alamos and

Palmetto growth is one of the worst pests on Florida farm and grazing lands and, where relatively dense, is hard to clear out with man or horse power because of its sharp-bladed leaves; tractors now are clearing many acres.

PHYSICS-CHEMISTRY

Heredity Chemical Found

Desoxyribonucleic acid now known positively to be constituent of genes. Male sex cells contain only half as much as other cells of same animal.

► ONE of the chemical foundation stones of inheritance has been discovered. It is a chemical with a long name, desoxyribonucleic acid. It is found in the nuclei of cells. Scientists have suspected, without being sure, that it also was present in genes. These are the tiny cell bodies that carry inherited characteristics such as eye and hair color which just had their "pictures" taken for the first time.

Now, for the first time, it has been shown positively that this chemical is a constituent of genes. The discovery, which it is said "may well prove a significant advance toward solution of the secret of life itself," was made by Dr. A. E. Mirsky of the Rockefeller Institute for Medical Research. He reported his studies at a sectional meeting of the American Chemical Society in New York.

Dr. Mirsky made his discovery through studies of pure chromosomes. These are the slender rodlike bodies in the nuclei of living cells which contain the genes.

All cells contain two sets of genes, except the sex cells. These reproductive cells each have only one set of genes. And purified chromosomes of the male cells, Dr. Mirsky found, contain only half as much desoxyribonucleic acid as other cells of the

same animal. This proves that the chemical is a constituent of the genes, he said. The long-named acid, however, is probably not the only chemical in genes, though no other compound has yet been identified.

The quantity of the chemical is identical for each cell in a given animal species, although it may vary from one species to another. Different types of cells, because they vary in weight, contain different proportions of the chemical, but the absolute amount is fixed for any animal species.

Genes, besides their part in inheritance, are known to play an important role in the life processes of cells, Dr. Mirsky pointed out. They are thought by some scientists to serve as master die patterns for enzymes. These are complex biological compounds which control all the body's chemical activity.

The "pictures" of genes recently unveiled to the world of science were not actually photographs but electron micrographs. And the scientists at the University of Southern California who "shot" the genes with an electron microscope are not positive that what they saw really consisted of genes. But they think it "reasonable" to believe they are genes. (See SNL, Jan. 29).

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"LIGHT PIPE"—A plastic "light pipe", flexible as a garden hose, can be used to guide a bright beam of light around corners and into hidden nooks and crannies.

BIOLOGY

Cockroaches Found to Harbor Food Poison

► COCKROACHES, man's pestiferous companions for perhaps millions of years, have for a half century or so been suspected of spreading disease. Now scientists are beginning to get some definite proof for this suspicion.

In laboratory tests, cockroaches will harbor one kind of the food-poisoning germs, called *Salmonella*, for several days, Dr. Theodore A. Olson of the University of Minnesota School of Public Health reported at a milk and food sanitation symposium held in Washington, D. C. under the auspices of the U. S. National Institutes of Health.

If the roaches deposit their excreta on food or dishes in the pantry, the food-poisoning *Salmonella* will remain alive for a month or so, the laboratory studies showed.

Carbonated beverage bottles will also carry their share of disease germs on their outsides if kept in water coolers into which many hands dip to pull out a bottle. Drinking from the bottle, of course, gets these germs into the drinker's system.

But the bottles can be kept as germ-free on the outside as the contents are when they leave the manufacturer. All that is needed is a weekly change of the water in the cooler plus the addition once a week of suitable sanitizing agents, Irving Olitsky, graduate fellow at Michigan State College, reported.

Quaternary ammonium compounds and chloramine T are the type of sanitizing agents he recommended, on the basis of his studies, to the American Bottlers of Carbonated Beverages.

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MEDICINE

Staples Prevent Limping

Made of stainless steel, and less than an inch long, they are driven into bone bridging growth zone. May correct knock knees or bow legs.

► STAINLESS steel staples less than an inch long are the latest medical tool for helping polio-damaged and other crippled children walk normally.

They were demonstrated in Chicago by Drs. Walter P. Blount, Donald W. McCormick and George Clarke, of Milwaukee, at the exhibits of the American Academy of Orthopaedic Surgeons.

One use of the staples is to keep a child from limping all his life on one short and one long leg. Another is to correct knock-knee. Bow leg, the back-knee deformity of infantile paralysis and the bent knee following arthritis or injury can also be corrected by the staples.

Through a small cut the staples are driven into the bone, bridging the growth zone. This mechanically stops the leg from lengthening at one of several levels of

growth. For knock-knee the staples are placed on the inner side of the knee. For correcting bow legs they are placed on the outer side.

The child can return to school a few days after the operation, but he is closely watched to see how he walks and X-ray pictures are taken at intervals to measure the length of the legs.

When the deformity has been corrected, the staples are taken out and growth of the bone starts up again.

The child must be treated while he still has two or more years to grow, the Milwaukee doctors pointed out. The method can be used in children as young as eight years. The reversibility of retentive force is said to be a revolutionary feature of the method.

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PHYSICS

Sound Washes Clothes

► CLEANER clothes with shorter hours at the washing machine may be in store for housewives, thanks to sound waves of such high frequency that you cannot hear them.

How sound waves can save hours in washing was disclosed in preliminary reports of experiments conducted by a team of scientists at the Pennsylvania State College.

Cotton fabric was scientifically soiled so that 50 washings by a commercial laundry would remove 90% of the dirt, if the best possible procedures were used. Three commercial laundries washed the cloth for from 50 to more than 58 hours.

Best whiteness produced by the laundries was equal to that obtained in the laboratory after only one hour in a pan of soap and water which was placed above an ultrasonic siren.

MEDICINE

Drugs Don't Cure Heartburn

► RX FOR HEARTBURN: a change in eating habits and "therapeutic discussions." This, in brief, is the prescription found successful by two Philadelphia physicians, Drs. Henry J. Tumen and Edwin M. Cohn of the University of Pennsylvania Graduate School of Medicine and the Jewish Hospital.

Drugs, including antacids, are of little use in treating heartburn, they report in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Jan. 29).

Eating too fast, gulping down food, washing it down with large quantities of water (two or three glasses per meal), free use of carbonated drinks and gum chewing

In another test, only 80% as much dirt was removed with only soap and water washing in the laboratory for more than 16 hours as was removed by the one-hour "sound wash."

Soap and water were changed only five times during the ultrasonic cleaning, while the laboratory washing had 50 changes. In the commercial laundries, the soap and water went through 50 complete cycles, each consisting of three suds and series of rinses.

First scientific report of the ultrasonic laundry experiments was published in the JOURNAL OF THE ACOUSTICAL SOCIETY OF AMERICA (Jan.) by Drs. H. K. Schilling, I. Rudnick, C. H. Allen, Pauline Beery Mack and Joseph C. Sherrill. They emphasize that they are giving only preliminary findings from early—but successful—experiments.

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sions" helped these people see the relation between their tenseness and the heartburn and to see how to overcome both.

Heartburn is not due to any organic disease of the digestive organs, nor is it due to excessive stomach acidity, the doctors state.

Their findings are based on a study of 120 patients coming consecutively to the office for various digestive disorders. Of this group, 21 men and 25 women had heartburn. All were helped by the discussion and change in eating habits. Patients with more severe personality problems were encouraged to get psychiatric treatment. In three cases this was definitely helpful.

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Question Box

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GENERAL SCIENCE

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RESOURCES

How much potential farm land does Alaska have? p. 93.

ZOOLOGY

In what way will Deamer the lemur contribute to scientific knowledge? p. 86.

PSYCHOLOGY

What Is Happiness?

Enjoyment of work, good health and love are elements of happiness as seen by Danish and American students.

► **WHAT** is happiness—to you?

If you place enjoyment of your work, good health and love at the top of the list of factors on which your own happiness is based, you will be in agreement not only with American college students but also with a group of Danish students recently surveyed.

The Danish study, just published in this country in the *JOURNAL OF SOCIAL PSYCHOLOGY*, was made by Dr. Holger Isager at the International People's College. The Danish college is at Helsingør, celebrated as the Elsinore of Shakespeare's Hamlet.

For the Danes, these three most important elements of happiness are followed closely by good fellowship, a clear conscience and freedom. Perhaps, the author comments, the stress on freedom may be due to the fact that these students have only recently emerged from the oppression of the German occupation, when many kinds of freedom that were formerly taken as much for granted as the air we breathe were abolished.

Liquor, power, politics, money and prestige are put at the bottom of the list of things contributing to happiness by the students. Even religion holds a relatively un-

important place in spite of the fact that clear conscience is in the lead.

A majority of those surveyed consider themselves happy, in general. Comparison of the happy with those who feel that they are often unhappy showed that the happy put more stress on clear conscience while the unhappy need economic independence and travels for their well-being.

Although the students were permitted to add to the list given them to check any further elements of happiness that they considered important, very few felt the need to add to it. One said he felt happiness to depend on "a good armchair, a good pipe of tobacco, and good book and flaming fireplace."

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ENGINEERING

New Tests Measure Qualities of Asphalt

► **THE** selection of the right asphalt for the particular job, whether surfacing a street, water-proofing a cellar wall, or covering a house roof, can be made with the aid of a new series of tests, the American

Chemical Society was told by Edmund Thelen of the Franklin Institute.

An efficient and coordinated scheme consisting of five separate tests has been devised, he stated, to measure the properties of asphalt-like materials. They measure resistance to impact, damage by vibration, flow at high temperatures, adhesion to rocks and fibers, and whether the material will run on a warm day and crack upon sudden cooling.

They are laboratory tests, requiring relatively little time to complete. The usual test methods involved applications on the job and weeks or months of waiting to determine results. In the first of this new series, it can be learned how well the asphalt will flow while being applied hot, and how tight a bond it will make to solids.

Other tests make it possible to estimate the brittleness of cold asphalt, and to show how tightly the material will adhere to the other materials used with it. Vibration tests are important because a road surface can fail due to vibrations caused by heavy traffic.

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MEDICINE

Electrical Activity In Polio Muscles

► **IN** patients with acute infantile paralysis, abnormal electrical activity can be detected in the muscles while at rest, whether the muscles have normal strength or are weakened by the disease. But the completely paralyzed muscles, with some exceptions, are electrically silent.

These findings have been observed in widely separated clinics, Dr. Arthur L. Watkins of Harvard Medical School said at the meeting of the American Academy of Orthopaedic Surgeons in Chicago.

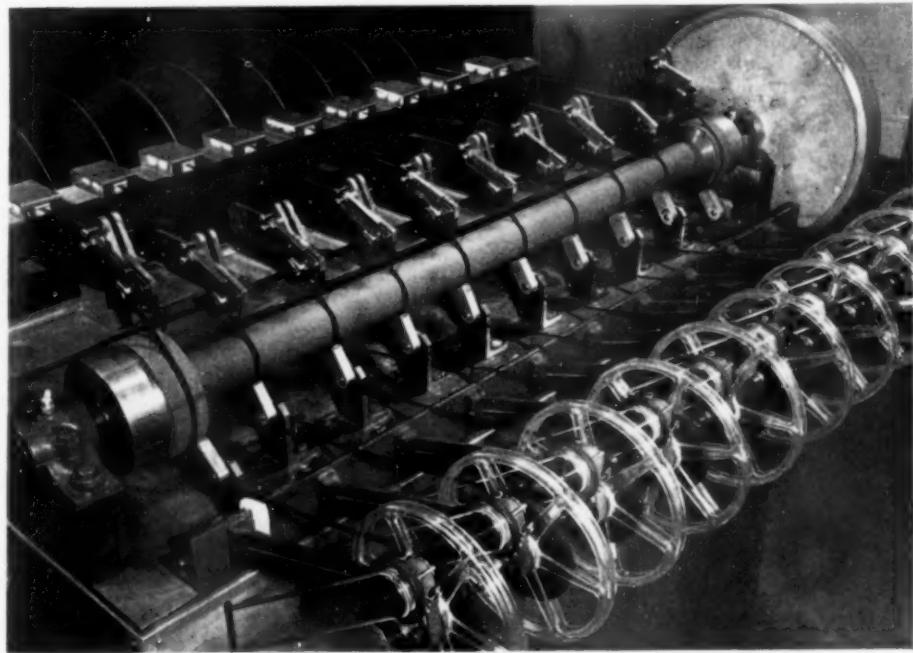
"Change in position or passive stretching has been found to produce strong discharges from the muscles in spasm corresponding to the clinical findings of pain and tenderness," he continued.

Studies of electrical discharges from muscles are also useful, he said, where there is "suspected hysteria or malingering as normal potentials may be discharged from the muscles apparently paralyzed. Greatest value of such studies is probably in following the course of regeneration of peripheral nerves to determine the extent of reinnervation of muscles."

"In the case of Parkinson's disease, the electrical recording of the tremor characteristics is so constant that it is of diagnostic importance."

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Neatsfoot oil and stearine are obtained from the leg bones of cattle; in the process the bones are cooked and the fat skimmed off, strained, heated and filtered to obtain neatsfoot stock from which the two products are separated.



MUSIC ON TAPE—This machine which makes simultaneously 48 hour-long tape recordings paves the way to mass production of recorded music on tape.

GENERAL SCIENCE

40 Winners Are Selected

Nine girls and 31 boys (proportion determined by ratio of boys and girls entering the contest) are being invited to Washington, D. C., for an all-expense trip March 3 through March 7, to attend the Eighth Annual Science Talent Institute. Here one boy or girl will be awarded the \$2,800 Westinghouse Grand Science Scholarship. Other scholarships, bringing the total to \$11,000, will range from \$100 to \$2,000. They will be awarded at the discretion of the judges.

CALIFORNIA			
Claremont	Taylor, Dwight Willard	17	Webb School of California
Glendale	Shugart, Howard Alan	17	Herbert Hoover H. S.
Lomita	Thorp, Edward Oakley	16	Narbonne H. S.
DISTRICT OF COLUMBIA			
Washington	Werntz, Carl Weber	17	Coolidge H. S.
	Gilbert, Walter	16	Sidwell Friends School
ILLINOIS			
Arlington Heights	Bohrer, Vorsila Laurene	18	Arlington Heights Township H. S.
Oak Park	Johnson, Laveta Audrey	17	Oak Park Township H. S.
IAWA			
Grinnell	Kaufman, John David	16	Grinnell H. S.
KANSAS			
Topeka	George, Myron Don	17	Highland Park H. S.
LOUISIANA			
Lafayette	Conner, Pierre Euclide, Jr.	16	Cathedral H. S.
MASSACHUSETTS			
Andover	Kimball, John Ward	18	Phillips Academy
MISSOURI			
St. Louis	Stout, George Hubert	16	St. Louis Country Day School
	Merz, Edwin Henry, Jr.	17	Southwest H. S.
NEW JERSEY			
Millburn	Shiman, Paul Leonard	17	Millburn H. S.
New Brunswick	Boldt, Elihu Aaron	17	New Brunswick H. S.
NEW YORK			
Brooklyn	Goldman, Alan Joseph	16	Abraham Lincoln H. S.
Forest Hills	Bauman, Norman	16	Midwood H. S.
	Bach, Michael Klaus	17	Forest Hills H. S.
Newburgh	Victor, Ursula Vivian	16	Forest Hills H. S.
New York	Wagman, Anne	16	Forest Hills H. S.
	Winston, Herbert	15	Forest Hills H. S.
	Clough, Garrett Conde	17	Newburgh Free Academy
	Brett, Jack Samuel	17	Bronx H. S. of Science
	Landau, Henry Jacob	17	Bronx H. S. of Science
	Brilliant, Martin Barry	17	Stuyvesant H. S.
Scarsdale	Jaburg, Erika Elizabeth	18	Walton H. S.
Schenectady	Kriegsman, William Edwin	16	Scarsdale H. S.
	Zalutsky, Rosalyn Edith	17	Mont Pleasant H. S.
OHIO			
Cleveland	Martin, Thomas Francis	17	Cathedral Latin School
Galena	Dell, Fritz	17	Harlem Township H. S.
Terrace Park	Reinhardt, Nicholas	17	Terrace Park H. S.
OKLAHOMA			
Oklahoma City	Littlejohn, Caroline Stuart	16	Classen H. S.
OREGON			
Eugene	Bray, Richard Arthur	17	Eugene H. S.
PENNSYLVANIA			
Philadelphia	Oels, Helen Claire	17	Little Flower Catholic H. S. for Girls
Pittsburgh	Harmon, Margaretta Vanya	16	Philadelphia H. S. for Girls
	Plantz, Charles Arthur	16	Mt. Lebanon H. S.
TENNESSEE			
Nashville	Barr, Thomas Calhoun, Jr.	17	Hillsboro H. S.
TEXAS			
Galveston	Anigstein, Robert	16	Ball H. S.
UTAH			
Mt. Pleasant	Nelson, Roger Hugh	17	North Sanpete H. S.
WISCONSIN			
Shorewood	Blattner, Robert James	17	Shorewood H. S.



SCIENTIST WITH FIND—Harry Hoogstraal, Chicago Museum of Natural History entomologist and mammalogist, shows the lemur which he and Chief Hospitalman Deamer K. Lawless, U. S. N., acquired in French Madagascar.

ZOOLOGY

Deamer, the Lemur, Will Help Science

► DEAMER the lemur, a friendly 10-inch-long monkey-like creature with a 14-inch tail, led the Navy's medical science group of the University of California's African Expedition into town.

Deamer, who also answers to the French Madagascar name of Make, arrived by air, cuddled inside the shirt of his patron, Harry Hoogstraal, Chicago Museum of Natural History entomologist and mammalogist who was attached to the expedition.

Deamer's contribution to science will come through studies of how he uses his bones and muscles in jumping, holding food, walking and other activities, including sleeping, Mr. Hoogstraal explained. Lemurs are rather scarce in zoos in this country and may only be imported under special arrangements. Deamer belongs to the catta species of lemurs.

Deamer's front lower teeth are arranged like a comb for grooming, and with this and a special claw on his foot, he keeps himself very clean.

Deamer is playful and a good drinking companion. While he prefers champagne and beer, he will take laboratory alcohol in a pinch. But when nervous or excited, as on the plane trip to America, he drinks a "terrific amount of water."

His name, Deamer, is an adaptation of the first name of Chief Hospitalman Deamer K. Lawless, U. S. N., of Grundy Center, Iowa, who, with Mr. Hoogstraal, acquired the lemur.

GENERAL SCIENCE

Future Leaders In Science

Nine girls and 31 boys have been invited for an all-expense visit to Washington to compete in the finals for scholarships totaling \$11,000.

► FORTY future leaders in American science—nine girls and 31 boys—have been invited to Washington for a five-day, all-expense visit. While at the annual Science Talent Institute, they will compete for \$11,000 in Westinghouse Science Scholarships in the finals of the Eighth Annual Science Talent Search conducted by Science Clubs of America, administered by Science Service.

The 40 trip-winners were chosen by a panel of judges after a nation-wide competition in which top-ranking seniors in all the public, parochial and private schools in the continental United States were invited to participate. Entrants, representing every state in the Union, totaled 16,218, of whom 2,482 completed the stiff science aptitude examination, submitted recommendations and scholarship records and wrote an essay on "My Scientific Project."

At the end of the winners' five-day stay in Washington, March 3 through March 7, the judges will award the scholarships. One boy or girl will receive the \$2,800 Westinghouse Grand Science Scholarship (\$700 per year for four years). The runner-up will receive a \$2,000 Westinghouse Science Scholarship. Westinghouse Science Scholarships, ranging in size from \$100 to \$400 and bringing the total to \$11,000, will be awarded at the discretion of the judges to the rest of the winners.

The scholarships may be used at any college, university or technical school of the winners' choice so that they may con-

tinue their training in science or engineering.

Chosen without regard to geographic distribution, the 40 trip-winners come from 32 localities in 17 states and the District of Columbia. Three states, Louisiana, Texas, and Utah, have winners this year for the first time. This brings to 38 the total of states that have been represented by winners since 1942.

Two high schools in the United States have produced more than one winner this year. Two boys and two girls have been invited to come from the Forest Hills (N.Y.) High School, and the Bronx High School of Science in New York City will send two boys.

Exactly half of the winners this year come from schools that have never before placed winners in the annual Science Talent Search. Others among this year's winners are adding new laurels to schools already honored by having produced winners in the past.

Of the 280 winners (40 per year) named in the first seven Science Talent Searches, 11 have come from the Bronx High School of Science and eight from Stuyvesant High School. Both schools are in New York City. Forest Hills (N.Y.) High School has sent six winners in previous contests, and four each have come from Herbert Hoover High School in Glendale, Calif., Eugene (Ore.) High School, and Shorewood (Wis.) High School. Oak Park Township High School in Oak Park, Ill., and Walton High School in New York City have each produced three winners in the past. Two Brooklyn schools, Abraham Lincoln High School and Midwood High School, have produced two winners each, as has Southwest High School in St. Louis, Mo. The following schools have had one winner each in the past seven years: Millburn (N.J.) High School, New Brunswick (N.J.) High School, Mont Pleasant High School in Schenectady, N. Y. and Mt. Lebanon High School in Pittsburgh, Pa.

Most of the winners live at home and attend their local or nearby public, parochial or private secondary schools.

Over half (60%) of the Science Talent Search trip winners rank first, second or third in their graduating classes, which range in size from 13 to 700 students. Approximately 70% of the winners' fathers and 50% of their mothers attended colleges. A number have parents who were born or educated abroad and some of the winners themselves are of foreign birth.

Contrary to a frequent conception of scientists the winners are not interested in

science only. While most of them spend much of their spare time in science pursuits such as science clubs and individual hobbies of a scientific nature, all of them have participated in varied extracurricular interests such as music, athletics, journalism and dramatics, and all belong to social and educational organizations outside their school work.

Many of the top 40 have already chosen the lines of study and research they wish to pursue. Physics attracts eight, while nine intend to study chemistry. Three hope to enter medicine as a career and four want to be biochemists. Others plan careers in mathematics, astronomy, psychiatry, engineering, geology, psychology, biology, anthropology, ornithology, paleontology and bacteriology. All hope to do research in their respective fields.

Most of the 280 winners in the seven Science Talent Searches held since 1942 are now students in colleges or universities where they are preparing themselves for scientific careers. A total of 109 of them now have undergraduate degrees, 11 have master's degrees and one is a Ph.D. Six are already M.D.'s. A few are now employed fulltime in jobs in industry or are on university teaching or research staffs. None of the 280 previous winners is more than 25 years old.

In addition to the 40 trip-winners who will attend the Science Talent Institute in Washington, an Honorable Mentions list of 260 in the Eighth Annual Science Talent Search will be announced Feb. 10. These high ranking contestants will be recommended to colleges and universities for their aptitude in science. If they are as fortunate as those previously included in the Honorable Mentions list, they will receive offers of scholarships from many institutions of higher education seeking students with talent in science.

Through an arrangement with Science Clubs of America, 18 states are conducting state Science Talent Searches concurrently with the national competition. In these 18 states all entries in the national Science Talent Search will be turned over to state judging committees. From their entries they will choose state winners and award scholarships to various colleges and universities within the state. Cooperating states are: Alabama, District of Columbia, Georgia, Illinois, Indiana, Iowa, Louisiana, Massachusetts, Michigan, Minnesota, Mississippi, Montana, Pennsylvania, South Carolina, Tennessee, Virginia, West Virginia and Wisconsin.

The judges of the Science Talent Search are: Dr. Harlow Shapley, director of the Harvard College Observatory and president of Science Service; Dr. Harold A. Edgerton and Dr. Steuart Henderson Britt, psychologists of New York City; and Dr. Rex E. Buxton, psychiatrist of Washington, D. C. Drs. Edgerton and Britt design the Science Aptitude Examination each year for the Science Talent Search.



DEAMER, THE LEMUR—Deamer, rare visitor to this country, will be studied to find out how he uses his bones and muscles in various activities.

ELECTRONICS

Electron Tube Amplifies Very High Frequencies

► A NOVEL FORM of electron tube which can amplify radio signals of very high frequency was revealed by the Naval Research laboratory. This new electronic device has been dubbed "The Electron Wave Tube."

The inventor, Dr. Andrew V. Haefl of the laboratory staff, states that the instrument makes use of the same method as nature itself uses in generating microwaves in the sun and stars. Streams of electrons of different velocities are injected into evacuated space. The electrical repulsion between electrons causes radio signals applied to the streams to be greatly amplified as the electrons drift through space.

By this method, he states, he has achieved energy amplification of over 100,000,000 times in a single electron wave tube. The fact that in order to obtain such tremendous amplification, the electrons are simply injected into a hollow metal tube and permitted to drift along, makes the new device unique in the family of high frequency radio tubes, which usually require electrical circuits of intricate mechanical construction.

The development of the electron wave tube promises to expedite greatly the exploitation of the optical properties of extremely short waves.

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ENGINEERING

Portable Power Plants For Disaster Aid

► PORTABLE power plants on railway cars can help bring electricity overnight to disaster-stricken communities, an engineer proposed.

Brainard G. Hatch of the General Electric Company suggested that gas turbine power plants with a capacity of 3,500 to 5,000 kilowatts of electricity be mounted on two or three railway cars. This unit could be rushed to any area where emergency power was needed.

Science News Letter, February 5, 1949

INVENTION

New Check Is Adapted To Three Groups of People

► CHECKS have to fit the habits of three different groups of people—usually an impossible demand. First, you and I, average citizens, want to scribble them as we please, pin them to letters, carry them folded or even crumpled in our pockets. Then there is the teller at the bank window, who squints at the endorsements, slaps on a rubber stamp, spears them on a spindle and gives you your money.

Finally, back in the "works" of the bank, are the workers on mysterious punch-

SCIENCE NEWS LETTER for February 5, 1949

card machines, who translate your figures into meaningful holes and notches for the mechanical fingers and brains of their robots. These folk look with disapproval on foldings, pinholes, spindle punctures and the like, which may lead the robots to false conclusions.

A check form that will reconcile these conflicting demands has been invented by N. D. Callanan of Buffalo, who has just received U. S. patent 2,459,263 on his idea. It is simple enough. One end is made of ordinary check paper, which can be worked on with pens, pins, tellers' spindles or what have you. The other end, firmly bonded to it, is of punch-card stock, and is sacred to the robot-feeders in the accounting department. So everybody ought to be happy.

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PALEONTOLOGY

Fossil Coyote Species Found in California

► A COYOTE-LIKE animal with some of the features of a hyena is represented by a fossil skeleton found near Ricardo, Calif., and described in a new University of California scientific publication, by Morton Green, graduate student in paleontology.

The animal, which Mr. Green has named *Tomarctus robustus*, was shorter-legged and bigger-pawed than the modern coyote. It had heavy crushing jaws, which further heighten its resemblance to the hyena.

In the place where the animal's stomach was when it lay down and died were found the remains of its last meal, the teeth and crushed bones of a rabbit.

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FORESTRY

Porcupines Prefer Larger Sizes in Trees

► PORCUPINES, which are merely interesting animals to summer tourists and campers, are serious, money-costing pests to foresters in winter. They gnaw bark from trees, frequently causing death by complete girdling.

Up to now, nobody has known for certain what size trees the bristly beasts were most likely to chew on. So tree-growing scientists of the Lake States Forest Experiment Station, St. Paul, Minn., made close counts of porky-gnawed trees on a jack pine plantation in northern Wisconsin and a Scotch pine plantation in lower Michigan. They found a definite preference for larger, more vigorous trees in all cases; hardly any attacks had been made on trees less than three inches in diameter.

Practical significance of this discovery is that anti-porcupine measures do not need to be taken until the trees are at the three-inch 'teen-age' sizes; but these and all larger trees do need protection against porky's chisel teeth.

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IN SCIENCE

VETERINARY MEDICINE

The Army Mule Gone; "Vets" Find New Jobs

► HORSELESS cavalry scouts for the Army now, muleless supply trains bring up chow and ammunition, and the caissons go rolling along only in the song; yet the Army's veterinarians are not jobless. They have simply turned their skill to other tasks, the JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION points out.

Their main concern now is with the inspection of meats and other animal products used by the armed forces, and the planning of improvements in the handling of these commodities. Also, because unexpected developments may some day necessitate a return to animal power for some military purposes, veterinary corps personnel will continue to receive training along this line.

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MEDICINE

Develop "Single-Shot" Hypodermic Syringe

► A ONE-DOSE, discardable hypodermic syringe, intended primarily for military and other field uses, is the subject of patent 2,460,039, granted to Robert P. Scherer and John Otto Scherer of Detroit. As prepared for carriage, the dose of drug or serum is already in place, separated by a diaphragm from a compartment in which the needle is stowed, supported by a suitable guide, its point aimed at a sealed aperture. The whole setup is of course sterilized.

To put into use, the aperture is merely set against the point of injection and pressure applied to the plunger. This causes the needle to thrust forward through the seal and into the patient's muscle. The other end of the needle, in the meantime, pierces the diaphragm into the stored dose, which is thus injected in the usual manner.

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ENGINEERING

Scientists Build New Phone Booth

► NEWEST scientific advance in telephoning, reported by Bell Telephone Laboratories, is a better phone booth.

The new booth features a ceiling ventilator, concentrated lighting on the phone and writing shelf and a tougher, rubber floor. Production is scheduled to begin soon on the new booth.

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ONE FIELDS

HORTICULTURE

Seed Catalogs Becoming Less Like "Spring Fiction"

► SEED catalogs, once jocularly referred to as "spring fiction", are becoming more factual, declare scientists of the U. S. Department of Agriculture. Such Hollywoodian adjectives as "superb," "magnificent," and "colossal" are giving way to soberer mention of the vegetables' suitability for freezing, canning, home consumption or shipping.

There is still room for improvement, the never-satisfied research men point out. Much is now known about the specific vitamin values of certain vegetable varieties, and they think it would be fine if the catalog compilers would use the ax on a few more adjectives and use the space for some mention of what vitamins you are harvesting when you gather a mess of snap-beans or pick a basket of tomatoes.

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ENGINEERING

New Explosive Cuts Cost Of Removing Tree Stumps

► PULLING TREE STUMPS to make pulpwood out of them is rarely economical because of the cost, but blasting them out with a new explosive provides a method that is not too expensive, the U. S. Department of Commerce indicates.

The explosive, known as Macite, is a TNT-coated ammonium nitrate mixture with a special catalyst making it sensitive enough for use with standard detonating caps. The use of this explosive is particularly recommended where cut-over land is being cleared for farming.

The report of the government agency, entitled Stump Removal Project, is based on work carried out by the University of Florida. It is available to those interested at a dollar a copy. It suggests cutting trees as close to the ground as possible because the entire trunk is good pulpwood while the stump itself is only of secondary value.

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CHEMISTRY

Natural Gas Freezing Due to Forming Hydrates

► COLD-WEATHER "freezing" of natural gas in transmission lines is due to the formation of crystalline compounds rather than the solidifying of the water in the gas, scientists now say. This conclusion comes from a joint investigation by representatives of the American Gas Associa-

tion in New York, and the U. S. Bureau of Mines in Washington.

The compounds formed are known as natural-gas hydrates. They are formed by the chemical combination of water and natural gas. Since the hydrates "freeze" or solidify at temperatures considerably above the freezing point of water, they form ice-like plugs which obstruct and often completely stop the flow of gas. These formations occur more frequently in high-pressure natural-gas lines.

A joint report of the study has been published at the expense of the American Gas Association, an organization supported by private industry. Copies may be obtained from the association, 420 Lexington Ave., New York City, but are not available from the government agency.

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PHYSICS

Slide Rule Measures Invisible Heat Rays

► THE amount of heat coming from a hot object can now be quickly and easily measured with what engineers of General Electric dub a special slide rule.

The device may be used to compute the total amount of energy being radiated, the wavelengths of the energy and the intensities of the radiation at the different wavelengths. Its use makes easy a process that has been long and tedious in the past.

In use, the radiation slide rule is set with one scale of the device on the temperature of the hot body. This setting brings other scales into line so as to indicate the wanted radiation factors. The device is particularly designed for the convenience of engineers working with problems in illumination, military applications in infrared, radiant heating and heat transfer. In such work it is important to know how much energy is coming from a source and where it is going.

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PALEONTOLOGY

Fish Fossils Being Excavated in Virginia

► FOSSIL skeletons of freshwater fish that lived in the middle of the Age of Dinosaurs have been found in a road cut near Haymarket, Va., and are being excavated for the Smithsonian Institution by Dr. David H. Dunkle. They belong to the upper Cretaceous period, approximately 175,000,000 years ago.

Fossils of this type are rare in this particular area, though similar ones are common in rocks found from Massachusetts to New Jersey. Related forms are also known from Australia and South Africa.

Nearest living relatives are found in the relatively primitive fish group known as the ganoids, of which the gar-pike and bowfin or freshwater dogfish are best known.

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AERONAUTICS

One-Man Attack Plane Carries Huge Load

See Front Cover

► A MARTIN AM-1 Mauler, one-man Navy attack plane, with a payload of more than 9000 pounds and a total gross weight of over 25,000 pounds has been flown on a routine test flight, it was recently revealed.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows how the new attack plane carries its three full-size torpedoes and rockets on the outside where it can easily be jettisoned in case of emergency. The cannon are built into the leading edge of the wings.

Pilots call the big dive-torpedo bomber "Able Mabel". This girl is faster and offers greater range and firepower than earlier carrier-based attack airplanes. On the recent flight the pilot reported that the takeoff, rate of climb and response to controls, even at low speeds, were "pleasant and easy" while landing with the tremendous weight was no problem at all.

Besides torpedoes, bombs and rockets, the Mauler's optional loading arrangements can include search radar equipment or extra fuel tanks, giving the powerful attack plane a maximum range of more than 2000 miles.

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ENGINEERING

Traffic Lights Can Be Cause of Accidents

► TRAFFIC lights can cause accidents instead of preventing them. Whether or not an intersection should have a light is a question for engineers, declares Prof. Taylor D. Lewis, Cornell University engineer.

Prof. Taylor explained that traffic lights where they are not needed "only encourage the contempt of the motorist for traffic regulation and weaken the whole structure of traffic control."

Poor design, faulty timing, improper installation and the contempt of the motorist can make the stop-and-go light a traffic hazard, he points out. He cites the amber "caution" light as an example. One motorist speeds through it, while another who has been waiting may "sneak" into his path.

Self-enforced slowing-down zones are one method which has proved more effective than lights in some traffic control situations, Prof. Taylor says.

Even when traffic lights prevent right-angle collisions, they may be dangerous at an intersection, he contends. In some cases, rear-end and right-turn smashups may be increased by the signal.

Diagrams of accidents at an intersection and counts of vehicles and traffic density are useful in helping decide whether a light will be useful or dangerous, Prof. Taylor concluded.

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CHEMISTRY

Stumps Yield Chemical Wealth

Rosin, turpentine and pine oil now extracted from pine roots, stumps and tops are utilized in products ranging from plastics to perfumes.

By MARTHA G. MORROW

► CHEMICAL wealth from old pine stumps is finding its way into:

Super solvents for lacquers and waxes. Trusty thinners for paints and varnishes. Invaluable ingredient for synthetic camphor.

Suitable sizing for paper and paper board. Mass manufacture of laundry soaps and soap powders.

The three basic chemicals extracted from stumps are rosin, turpentine and pine oil. They are used in products ranging from protective coatings to plastics, printing inks to shoe polish.

Within the last few years a wide variety of new uses has been developed for these materials extracted from the stumplands of the South. An insecticide with turpentine as a basic ingredient is proving successful against cotton insects. An industrial alcohol from rosin is now commercially available.

The pines, both longleaf and slash, from which these valuable materials are extracted, grow in the South, along the Atlantic coastal plain and the Gulf coast. Although found from North Carolina to Florida, and South Carolina to Mississippi, most of the rosin and turpentine from stumps comes from Georgia and Florida.

Last year more turpentine and rosin were extracted from pine stumps and fallen tree-tops than was obtained by tapping live pines. The resinified stumps and wood remaining after the sapwood has rotted off are being turned into a chemical gold mine.

Known as Naval Stores

Chemicals from pine trees, known today as centuries ago by the name of "naval stores," were the first products exported from what is now the United States. Turpentine, tar and pitch were first produced on this continent at Jamestown in 1608, according to the most authentic reports available.

With ax and chipper, the early settlers bled the sap from living southern yellow pines found in the vast Colonial forests. This they converted into pitch for caulking the seams of wooden sailing ships and tar for waterproofing their rigging.

Pitch and tar accounted for nearly all of the production of naval stores around George Washington's time. Today boats and shipyards use only a fraction of the total output, but the name "naval stores" still

sticks. Turpentine and rosin, by far the most important products of the industry today, are used in linoleum, disinfectants, matches, adhesives and even perfumes.

Until World War I, practically all of the naval stores chemicals obtained in the United States came from the gum of living trees. But recent processes have made it practical to extract these from pine stumps and fallen pine tops.

Within the last few years the wood industry has grown to overshadow the gum industry. In 1947-48, wood turpentine amounted to 54% and wood rosin to 58% of naval stores production. Before 1924, these accounted for less than 10% of the total production.

Millions of Tons of Roots

Pine stumps left by sawmills that ate their way through the virgin forests of the Southeastern and coastal Gulf regions offer an available and nuisance source for the chemicals. Millions of tons of roots, stumps and top wood are gathered each year.

The stumps are rooted out of the ground with bulldozers, then chopped into a better size for handling. Reaching the plant, they are washed, ground and shredded. How these large splinters and chips are handled next depends upon the process used.

The wood chips are placed in huge closed boilers in the steam-distillation process. Steam and a solvent separate out the turpentine, pine oil, rosin and other products. The spent wood may be used either as fuel, cutting down the cost of production, or as pulp for paper making.

The basic wood is destroyed in a second process. Here the chipped stumps and fallen tops are placed in a retort, sealed to keep the air out, and heated to the charing point. The gases are driven off and condensed. This process yields wood turpentine, tars, tar oils, rosin pitch and charcoal, but no rosin.

Paper Making By-Product

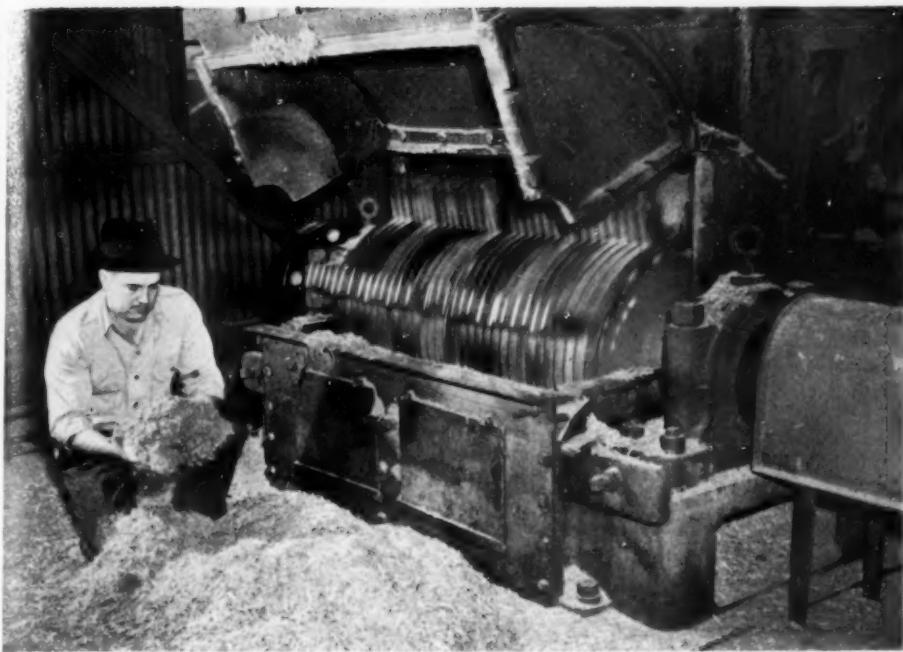
Sulfate wood turpentine is a byproduct of paper making. It is recovered by condensing the vapors released from the pulping digesters in producing pulp from pine wood by the sulfate process. Sulfur compounds contaminate the crude byproduct, and so must be removed.

A total of 346,875 barrels—17,343,750 pounds—of wood turpentine were produced in the year ending March 31, 1948, reports the Production and Marketing Administration of the U. S. Department of Agriculture. Steam-distilled rosin production for 1947-1948 amounted to 1,162,703 drums—604,605,560 pounds. This is the first time production in the United States has exceeded a million drums.

The supply of virgin stumps in the South will probably be exhausted in an-



GRUBBING—Uprooting pine stumps is the first step in the manufacture of naval stores products.



SHREDDING—Roots, stumps and tree tops are shredded before the turpentine, pine oil and rosin can be extracted. The valuable resinous content is later removed from the chips.

other 20 years or so. Then second-growth pine stumps may be worked, but not so economically—they are smaller and the rosin content relatively low.

So new methods of extracting gum from live trees are being developed. Today in many areas strips of bark are removed instead of harming the wood by cutting deep into the tree. Treating the streaks with acid or spraying them with 2,4-D has been found to increase the rate of flow and also to keep the gum flowing longer.

The largest producer of woods naval

stores products is Hercules Powder Company, a leader in the search for new products and new uses. Newport Industries, Inc., recently completed a \$200,000 research laboratory at Pensacola, Fla. Crosby Chemicals, Inc., is also active in the research field.

Better ways of extracting the chemical wealth from pine trees and a wider variety of uses for these products are constantly being developed. Rosin and terpene oils will continue to flow from pines, both living and dead.

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CHEMISTRY

Better Coal Use Expected

Acetylene could be mother substance for hundreds of organic chemicals and so could ethylene. Hydrogen, as well as methane, could be saved and converted.

► COAL today is under scientific investigation as never before, the American Chemical Society was told by Dr. Edward R. Weidlein, director of the Mellon Institute of Industrial Research, Pittsburgh. Fundamental studies are now being made in many laboratories to determine its possibilities, not only in the manufacture of synthetic liquid fuels but particularly as a source of the thousands of essential chemicals which it can be made to yield.

Up to now, the nation's abundant petroleum supplies have discouraged the study of coal, Dr. Weidlein said. Far too little fundamental research has been done with

this key mineral. We still do not know what coal is chemically, he said, and until we have this knowledge we are working under handicap.

Half the world's known reserve of coal is possessed by the United States, he stated. This nation has enough to meet all requirements for heat, light, power and transportation for more than 1,000 years at the present rate of consumption. Industrial leaders and technical experts believe that a large industrial development based on coal is in the making, and that a considerable expansion in coal production is imminent.

Atomic energy, in time, may replace coal

for the production of power, he continued, but it can not succeed coal as a rich source of carbon compounds. Chemically speaking, the whole range of organic chemicals can be made from coal.

In the past, coal has been the source of the so-called aromatic compounds on which the dye, drug, and explosives industries were founded. Alcohols are among the many other substances which can be derived from coal. By-product ethyl alcohol from two synthetic fuel plants now nearing completion will equal about one-fifth of the nation's present production from all other sources.

Acetylene from coal can be the mother substance for hundreds of organic chemicals, and the same is true for ethylene. Great quantities of free hydrogen are released in the usual coking of coal, most of which is lost. The gas called methane, given off in the same process, is now being converted into valuable liquid products. The hydrogen could likewise be saved.

Wider uses of coal for all purposes are foreseen by Dr. Weidlein. The petroleum supply picture has changed so radically that national security itself depends upon the development of new sources of liquid fuels, he declared. A World War III would require double the fuels of the past conflict.

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AERONAUTICS

Mock-Ups of Planes Used to Train Pilots

► WORKING mock-ups of airplane cockpits and fuselages were successfully used by the Navy during the war in training pilots and crews, and their use is now becoming widespread, the Institute of the Aeronautical Sciences meeting in New York was told by Luis de Florez, president of the de Florez Engineering Company.

The mock-ups were called synthetic aircraft by him. They are so designed and instrument-equipped that they can simulate the flight of any proposed aircraft. They can be used to reduce the risks and probably the costs of design and testing new planes, and make it possible to detect and correct faults before fullscale flight.

By the use of electronic computers, it is possible to portray the flight of the aircraft designed and furnish a preview of its performance. The task of familiarizing and training pilots and crews in the operation of new type aircraft is greatly simplified and made less expensive by these ground-based synthetic aircraft.

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Quaternary ammonium compounds are increasingly used as *germicides* and in cleaner-sanitizer preparations; they are derivatives of ammonium hydroxide or its salts in which hydrogen atoms are replaced by organic radicals.

ELECTRONICS

Tube Tests Effects of Supersonic Speeds on Planes

► A TUBE which can be used to test the effects of supersonic speeds on aircraft parts was described to the American Physical Society meeting at Columbia University by G. N. Patterson of the Naval Ordnance Laboratory and the University of Toronto.

The simplest form of shock tube, he explained, is merely a straight tube with a diaphragm dividing the tube into two sections containing gases at different pressures and temperatures. Shock waves are produced when the diaphragm is punctured.

By selecting special combinations of gases at various temperatures and pressures, scientists can create the shock waves found at a "very high" Mach number, Mr. Patterson said. Mach number is the ratio of air speed to the speed of sound.

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Airplanes equipped with cross-wind landing gear, now becoming more widely used, take off in less distance with side winds than they do in still air.

Here's a lesson in heat conservation from Norway: some 5,000 gallons of formerly wasted hot water from a manufacturing plant will be piped daily to a new community center building and used to keep it warm.

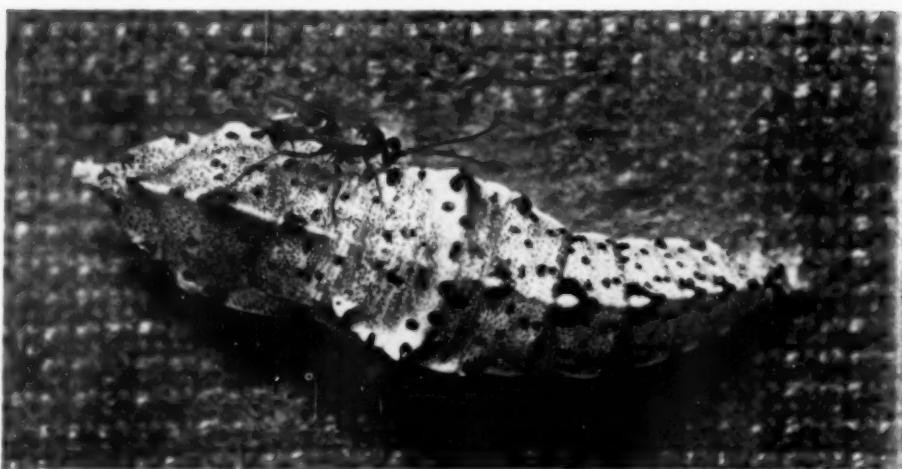
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FIFTH COLUMNIST AT WORK—The ichneumon fly—really a wasp—perched on the back of a cabbage butterfly pupa is breaking down the enemy's defenses. The ichneumon fly lays eggs inside the pupa.

ENTOMOLOGY

Insect Fifth Column

Cabbage butterfly and wasp-like creature, the ichneumon fly, play leading roles in a tense insect drama.

► AN EVIL-DOER from the Old World that brought its own nemesis with it is the common cabbage butterfly—the particular one known to scientists as *Pieris rapae*. As everyone who tried to raise a Victory Garden during the war knows, it is a serious menace to cabbages and all their relatives. This insect, common in Europe, came to this country early and has made itself altogether too much at home.

However, along with it came one of its deadliest and most persistent enemies, the small wasp-like creature known commonly as the ichneumon fly. There are many species of ichneumon flies, most of them confining their attentions to one kind of victim-insect. The one that attacks the cabbage butterfly bears the somewhat topheavy title of *Apantela glomeratus*.

But she gets there just the same. Point of attack is neither the fluttering white adult nor the leaf-devouring larva, but the still, stiff intermediate stage, the pupa—which might be described as a caterpillar waiting to become a butterfly.

The larva that an Apantela female finds never gets that chance. She alights upon its unprotected outer skin, bores through it with her long, hair-like egg-laying apparatus, and proceeds to deposit a number of eggs inside.

Presently these hatch into hungry little larvae, which feed greedily upon the pupa's soft, juicy flesh—as thorough a job of boring-from-within as can be imagined. What eventually emerges from the pupa-case is

not a new cabbage butterfly but a small flock of new Apantelas. After they have attended to the necessary business of mating, the females flit off to hunt for more cabbage-butterfly pupae. Nobody needs to teach them what to do when they find them.

These pictures, which show Mother Apantela about to deposit her eggs, and what happens to the luckless pupa's inside works, were taken by an English naturalist-photographer, Douglas F. Lawson. But the tense little insect drama which he recorded in his Surrey garden could be matched, millions of times over, not only in American cabbage-patches but practically everywhere in the world where cabbages are grown.

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Colds are common in winter among poultry, especially the younger birds.

The so-called tree-climbing kangaroo of Australia rarely comes to the ground; it exists on a diet of leaves and fruit.

Birds are not a major hazard to airplanes in flight but many bad accidents have resulted from collisions with flying ducks, geese and others.

Flaxseed production in the United States for 1948 was approximately 25% higher than for the previous year; important products from flaxseed are linseed oil for paints and linseed meal for cattle feed.

RESOURCES

Alaska Needs Waterpower

Electricity is needed for pumps and refineries to make available the untold wealth of its mineral resources. Oil fields are north of Arctic Circle.

► WATERPOWER development is the primary need in Alaska if its abundant raw materials are to be made available for use in the continental United States, it is indicated in *RECLAMATION ERA* (Jan.), official publication of the U. S. Bureau of Reclamation.

Alaska has water enough and plenty of sites where hydroelectric power plants could be erected. There are 30 major potential hydroelectric power sites in southeast Alaska alone, which could have a continuous capacity of more than 300,000 kilowatts, the publication states. This is in the area of the extensive Tongass National Forest, which could supply enough pulpwood to meet a fourth of all market demands in the United States.

Alaska, famous for its fur and fish, has about 65,000 square miles of potential farm lands and another 35,000 square miles suitable for grazing stock. Its untold wealth, however, is in its mineral resources, including both metal ores and petroleum. Its supposedly great oil field is in a naval reserve north of the Arctic Circle where exploratory wells have already been drilled. Transportation of the crude obtained can be easily made by pipeline across country to southern shipping points, but electric power is needed for the pumps and refineries.

The mineral resources of Alaska, a territory one-fifth the size of the United States proper with a terrain varying from flat lowlands to rocky mountains and a climate from that of New England to the North

Pole, have as yet hardly been touched. Much gold, of course has been mined. Approximately \$900,000,000 in mineral wealth has been taken from the earth since Alaska became American property, but some 70% of this was gold and 25% copper.

Other known minerals include iron, nickel, zinc, molybdenum, bismuth, silver, tin, tungsten, lead, chromium, platinum metals, antimony and mercury. Some of these have already been mined commercially; others may never be found in sufficient quantities to warrant commercial production. Among the non-metal minerals, in addition to petroleum, are asbestos, barite, garnet, graphite and sulfur. For mechanized mining electrical energy is important, and hydroelectric development would provide the energy.

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CHEMISTRY

New Materials from Gas Used in Making Bomb

► AN UNRULY gas, harnessed by scientists to help build the atomic bomb, may help form new materials ranging from lubricants to medicines.

Research on fluorides and fluorocarbons, chemical compounds containing the element fluorine, was discussed by scientists at a two-day conference at the Department of the Navy sponsored by the Office of Naval Research.

Fluorine is a gas which can cause water

to burn or cotton to explode. It was successfully controlled by scientists to produce the atomic bomb variety of uranium during the war.

Now chemists believe that fluorine compounds with unusual stability and high resistance to burning may be put to many important uses.

Future use of fluorine in dielectric materials, heat transfer media, hydraulic fluids, lubricants, plastics and possible new kinds of rubber were suggested by chemists at the conference. In addition, they said that fluorine compounds may prove useful in the manufacture of such organic chemicals as dyes, medicinals and insecticides.

The Office of Naval Research is sponsoring projects for the study of fluorine chemistry at 11 institutions, it was disclosed.

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Pure iron powder is to be obtained from waste *carbonate slate* in a new plant in Minnesota; carbonate slate is present in large quantities in the Mesabi iron range.

Brahma cattle are adaptable to the coastal region on the Gulf of Mexico because they stand heat and are resistant to ticks, flies and mosquitoes.

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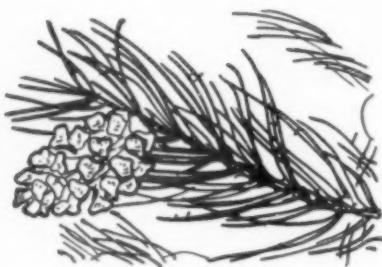


RESULTS OF SABOTAGE—When the eggs hatch, the ichneumon fly larvae dine greedily on the pupa's flesh. Result is one less cabbage butterfly but a small flock of ichneumon flies.

FORESTRY

NATURE RAMBLINGS

by Frank Thone



The Lesser Pines

► FORESTERS, lumbermen, botanists, even poets, celebrate the "lordly pine"—meaning, usually, a tree imposing to the eye, with a trunk big enough to make a fine log and saw up into handsome boards, or even to serve whole as a mast "for some high ammirail." There are pines enough to fit such specifications: *par excellence* the white pines, but also such tall brothers of the yellow-pine series as the long-leaf pine of the South and the ponderosa, black and big-cone pines of the West. Magnificent trees, all of them.

However, there are many pines of lesser stature than these, trees that would stand no more than waist-high or even knee-high to the pines that get all the press notices. They also have their place in the world, even if (like most of us common folks) they never get their names in the papers.

These lesser pines are to be found in all the major tree-growing regions, in all latitudes and altitudes, even in the tropics. But always they grow on the marginal lands, where pickings are meager and where it takes a decidedly thrifty, patient and tenacious plant to succeed at all—such places as the sandy coastal plains and clay hills of the South, the ill-balanced soils of the Middle Atlantic coast's serpentine barrens, the rocky shores of New England,

the dune sands of the Lake States and central Nebraska, the thin soils of Southwestern deserts and Rocky Mountain plateaus, the adobe hills and crumbling granites of the Pacific slopes.

In all these places you will find the lesser pines. Often they are spaced far apart because there isn't enough moisture to permit them to grow close together. There they will develop full-branched tops. Seldom though, are these symmetrically pyramidal like those of their more seemly kin-

trees. More likely they will be buffeted into gnome-like shapes by the fierce winds of mountainside winters or the soft insistent tyranny of salt-laden sea breezes.

Elsewhere, however, they will form close-ranked forests—too close-ranked, often, to permit the development of stout trunks. So characteristic is this weediness of some of the lesser pines that it has even given one species its characteristic name: *lodge pole pine*.

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AERONAUTICS

Fast Flight Problems

In designing planes to travel at speed of sound, pilot's safety and comfort must be considered if he is to be kept alive and functioning efficiently.

► THERE are human element problems to solve if planes are to travel at speed-of-sound velocities that are as important as those involved in aircraft design and power plant development. Technical advances are of little avail unless the pilot can keep alive and able to operate.

Technical progress in designing planes which exceed the speed of sound has been so rapid in the past two years that the problem also now becomes one of concentrating on the human factors, the Institute of Aeronautical Sciences was told by Dr. John T. Rettalata of the Illinois Institute of Technology.

He outlined four areas in what he called biotechnology in which engineering and medical scientists are working together to push aircraft flight further beyond the speed of sound. The problems have to do with excessive heat in the cockpit, "black-ing-out" of pilots, means of escape if necessary, and crash trouble.

Without cooling, the temperature in the cockpit would be approximately 200 degrees Fahrenheit at a speed of 670 miles an hour, he stated. To offset this, refrigeration is necessary. Scientists have developed a 16-pound unit to blow cold air on the pilot. It contains a small turbine with a rotor one and one-half inches in diameter and weighing one-half ounce.

Rapidly increasing speed, or slowing down, may cause a pilot to black-out, or lose consciousness. No difficulty is encountered in the functioning of the mental process when the speed remains constant, even though it may be very high. The problem is to protect the pilot, as by inflated clothing, in such a way that he will not black-out from blood leaving the brain in a pull-out from a dive, or from excessive blood being forced into the brain on an outside loop.

Speeds are now so great that pilots can not climb out and slowly descend in a parachute. At speeds of 500 miles an hour,

the corners of their eyes and mouths were torn and their ears were literally ripped off the sides of their heads. Dr. Rettalata declared. To solve the problem, designers have built ejector seats in planes, and pilots have been equipped with canopies to protect their heads.

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Hickory, oak and beech are *firewoods* that give much heat for their weight.

Photographs have been recently successfully sent by radio waves from a flying airplane to a publishing office some 85 miles away.

American agricultural scientists are attempting to develop a *sugar beet* of a different shape, one that can be more easily dug from the ground.

The Cape York peninsula in the northeast tip of Australia has strong geological and biological evidence for the supposition that it once was a *land bridge* to New Guinea.

Science Service Radio

► LISTEN in to a discussion on "The Conquest of Rinderpest" on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EST, Saturday, February 12. Dr. K. V. L. Kesteven, veterinary adviser to Food and Agriculture Organization and specialist on animal disease control, will report the discovery of a new and improved vaccine for one of the great cattle diseases which it was feared might be used by Germany for bacteriological warfare in World War II. This new discovery makes it possible to grow food in areas which lack protein food, particularly the Far East.

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A BRIEF BIOLOGY—James Watt Mavor—*Macmillan*, 427 p., illus., \$4.00. A text for a brief course following, in general, the presentation in the author's work, "General Biology."

THE CHEMISTRY AND TECHNOLOGY OF ENZYMES—Henry Tauber—*Wiley*, 550 p., illus., \$7.50. An up-to-date, technical review of enzyme chemistry including a section on the practical uses of enzymes in medicine, brewing, food industries, and textile, paper and leather industries.

EDUCATION IN PANAMA—Delia Goetz—*Govt. Printing Office*, 90 p., illus., paper, 25 cents. A report of the problems of a country having only 83,000 enrolled in school out of a school age population of 120,000.

EDUCATION IN VENEZUELA—Delia Goetz—*Govt. Printing Office*, 104 p., illus., paper, 30 cents. Timely study of the educational problems and how they are being handled, including the campaign against illiteracy.

ELEMENTARY PHOTOGRAPHY—Gifford G. Quarles—*McGraw-Hill*, 2d ed., 345 p., illus., \$4.50. A text for college students. The chapter on color photography has been rewritten and the whole text revised to improve its teachability.

HOW TO BE HEALTHY IN HOT CLIMATES—Eleanor T. Calverley—*Crowell*, 275 p., \$3.00. A handy book for those who are planning to live in the tropics and must learn about tropical foods, illnesses, and necessary sanitary precautions. The author was for many years a medical missionary in Arabia.

IN THE DENTIST'S OFFICE: A Guide for Auxiliary Dental Personnel—G. Archanna Morrison—*Lippincott*, 242 p., illus., \$5.00. A handbook of information and hints for that pleasant young lady who not only makes your appointments and sends you bills but assists the dentist in his work on your teeth.

THE LIMITATIONS OF SCIENCE—J. W. N. Sullivan—*New American Library*, 192 p., paper, 35 cents. Reprint of a book originally published by Viking. A philosophical work.

PRACTICAL ANALYSIS: Graphical and Numerical Methods—Fr. A. Willers—*Dover*, 422 p., illus., \$6.00. A German work on calculation and its various graphical and mechanical aids. Translated by Robert T. Beyer.

RECONNAISSANCE OF THE GEOLOGY AND OIL POSSIBILITIES OF BAJA CALIFORNIA, MEXICO—Carl H. Beal—*Geological Society of America*, 138 p., illus., \$3.00. Report of a study completed in 1921 for the Marland Oil Company plus additional information accumulated since. The survey was made under great difficulties during time of revolution when travel had to be by pack train in sections where the population was not more than one to 33 square miles.

RHEUMATIC FEVER NURSING CARE IN PICTURES—Sabra S. Sadler—*Lippincott*, 151 p., illus., \$3.50. Especially for parents who must care for a child confined to bed for complete rest.

SILICONES AND OTHER ORGANIC SILICON COMPOUNDS—Howard W. Post—*Reinhold*, 230 p.,

\$5.00. Includes a description of the research of Frederick S. Kipping who did the first organized work on organic compounds of silicon. It also tells how silicon compounds can be prepared both at ordinary and higher temperatures.

SOURCES OF FREE AND LOW-COST MATERIALS—*Civil Aeronautics Administration, Office of Aviation Training*, 17 p., paper, free upon request to publisher. A list of source material useful to the teacher.

YOUR COUGHS, COLDS AND WHEEZES—Joseph D. Wassersug—*Wilfred Funk*, 277 p., \$2.95. What you can do about all the various kinds of snuffles and barks from the common cold to the "cigarette cough."

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BIOLOGY

Russia Firing Scientists Who Hold Banned Ideas

► COMPLETENESS of the purge of Western, non-Soviet biological teaching in the USSR is indicated by the publication, in *SCIENCE* (Jan. 28), of a full translation of an article by S. Kaftanov, Minister of Higher Education in the USSR, which originally appeared in *Izvestia*. The translation is printed without editorial comment other than an expression of "the belief that it has high informational value for scientists in America."

Holders of the old, now banned, "foreign" ideas in biology, which are again roundly denounced as "reactionary" and "idealist," have been dismissed from many positions in universities and research institutions and their places taken by men who agree with the now officially orthodox doctrines of Michurin, as interpreted by Academician T. D. Lysenko. The latter has been made head of the Lenin Academy of Agricultural Sciences, and his mentor, I. Present, has taken the key position of dean of the biological faculty at the University of Moscow.

Comrade Kaftanov is specific in confessing the sins of his own division of the Soviet government: "We must admit that the principal responsibility for the defects of the teaching of biology lies on the Ministry of Higher Education. . . . The first task of the Ministry must now consist in the elimination of defects in the field of biology teaching and in the clearing of the field for Michurin's doctrine."

Drastic changes must be made, the Minister continues, in curricula and textbooks, and "All biological chairs and faculties must be held and supported by qualified Michurinists, capable of developing the progressive Michurin's doctrines."

The success of this reform in the teaching of biology in our colleges will depend

most of all upon the right choice of the teaching personnel."

This revolution in biological teaching does not stop with biology as such, or with its applications in such obvious applications of the science, as agriculture and forestry. It extends into the teachers' colleges and schools of medicine.

The article concludes with laudatory remarks on the activities of political heads of the government, notably Stalin, as guides to what is right in scientific research and teaching:

"Thanks to the Bolshevik Party and, personally to Comrade Stalin, ways for the further triumphant march of the most progressive Michurin biological science are now clear. The scientists of our colleges will apply, from now on, all their energy to the propaganda of Michurin's biology and to the support of undivided rule of Michurin's biological doctrine in our higher educations of learning."

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HORTICULTURE

Use Garden Hose to Rid Trees of Ice

► BRANCH-THREATENING burdens of glaze ice on your favorite shade or fruit trees can be removed by turning the garden hose on them. Even though the water may seem mighty cold to you, it is above freezing-point, and it will warm up the ice sheathing enough to loosen it. Then the force of the stream will dislodge the pieces.

This method is not to be recommended when the temperature is below the mid-twenties. However, glaze ice seldom forms in really cold weather; rain from a slightly warmer above-ground stratum falling into ground-level air in which objects are only a little below ice-forming temperatures is the usual cause of glaze.

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